Claims:

1. A non-contact article rotating apparatus comprising a first conveyor having a first plurality of individual rotating transporting components and a second conveyor having a second plurality of individual rotating transporting components, wherein an article moving on an article rotating apparatus is rotated around the article's generally vertical axis by selectively varying a speed of at least one individual rotating transporting component within one of either the first plurality of individual rotating transporting components or the second plurality of rotating transporting components.

2. The non-contact article rotating apparatus of Claim 1 wherein the article is rotated by one of either stopping or reversing at least one individual rotating transporting component within one of either the first plurality of individual rotating transporting components or the second plurality of rotating transporting components.

3. The non-contact article rotating apparatus of Claim 2 wherein the least one individual rotating transporting component within one of either the first plurality of individual rotating transporting components or the second plurality of rotating transporting components is stopped for a specific rotating period of time as determined by a value stored in a rotating timer.

4. The non-contact article rotating apparatus of Claim 3 further comprising at least one sensor that detects a position of the article on the non-

contact article rotating apparatus wherein the position of the article is used to at least one of either activate or deactivate the rotating timer.

5. The non-contact article rotating apparatus of Claim 4 wherein the specific rotating period of time may be adjusted to control the amount of angular rotation that the article is rotated about the article's generally vertical axis.

6. The non-contact article rotating apparatus of Claim 5 wherein each of the individual rotating transporting components of the first plurality of individual rotating transporting components and the second plurality of rotating transporting components include live rollers, and wherein the first conveyor is a first live roller conveyor containing a first plurality of live rollers and the second conveyor is a second live roller conveyor containing a second plurality of live rollers.

7. The non-contact article rotating apparatus of Claim 6 wherein the first plurality of live rollers of the first live roller conveyor are driven by a first drive belt, and wherein the second plurality of live rollers of the second live roller conveyor are driven by a second drive belt.

8. The non-contact article rotating apparatus of Claim 7 further comprising a motor operatively connected to the first live roller conveyor through the first drive belt and wherein the motor is operatively connected to the second live roller conveyor by the second drive belt.

9. The non-contact article rotating apparatus of Claim 8 further comprising a first plurality of snub rollers that urge the first drive belt against the first plurality of live rollers of the first live roller conveyor and a second plurality of snub rollers that urge the second drive belt against the second plurality of live rollers of the second live roller conveyor.

10. The non-contact article rotating apparatus of Claim 9 wherein the second plurality of snub rollers are controlled by a plurality of clutch/brake assemblies.

11. The non-contact article rotating apparatus of Claim 10 wherein each of the plurality of clutch/brake assemblies comprise a solenoid valve, a guided pneumatic cylinder, a brake pad, and a clutch/brake sensor.

12. The non-contact article rotating apparatus of Claim 11 wherein each of the clutch/brake assemblies is operatively connected to at least one of the second plurality of snub rollers, and the at least one of the second plurality of snub rollers and at least one brake pad are attached to a connector assembly attached to a cylinder rod of the guided pneumatic cylinder.

13. The non-contact article rotating apparatus of Claim 12 wherein the guided pneumatic cylinder is normally extended, with the at least one of the second plurality of snub rollers pushing against the second drive belt to drive at least one of the conveyor rollers of the second live roller conveyor.

14. The non-contact article rotating apparatus of Claim 13 wherein the clutch/brake sensor of one of the plurality of clutch/brake assemblies detects the article selected to be rotated as it travels upon the non-contact article rotating apparatus, wherein upon such detection, the sensor provides a signal to a control device that activates the solenoid valve of the related clutch/brake assembly to move the connector for that related clutch/brake assembly such that the brake pad mounted onto the connector contacts at least one of the live rollers of the second live roller conveyor and at least one snub roller of the second plurality of snub rollers is urged away from the second drive belt to thereby stop the at least one live roller of the second live roller conveyor from rotating.

15. The non-contact article rotating apparatus of Claim 14 wherein the control device variably adjusts the period in which each of the plurality of clutch/brake assemblies is activated and deactivated.

16. The non-contact article rotating apparatus of Claim 15 wherein the period in which each of the individual clutch/brake assemblies is activated or deactivated is related to an amount the article on the non-contact article rotating apparatus is rotated about its generally vertical axis.

17. The non-contact article rotating apparatus of Claim 16 wherein activation of the solenoid valve of the clutch/brake assembly causes the cylinder rod to move which in turn moves at least one of the second series of snub rollers away from at least one live roller of the second live roller conveyor, while

simultaneously applying the brake pad to at least one of the live rollers of the second live roller conveyor to stop the live roller from rotating.

18. The non-contact article rotating apparatus of Claim 17 wherein the solenoid valve for one of the plurality of clutch/brake assemblies is deactivated when the clutch/brake detector senses the article has passed by at least one of the second plurality of live rollers of the second live roller conveyor that has been stopped from rotating, thereby allowing the connector to move upward to release the pressure applied by the brake pad to the live roller that was stopped from rotating, while the connector at the same time urges at least one snub roller from the second set of snub rollers into contact with the second drive belt such that the second drive belt rotates the at least one live roller of the second live roller conveyor.

19. The non-contact article rotating apparatus of Claim 18 wherein the amount of time the article takes to rotate about its generally vertical axis is based upon the conveyor speed of the first live roller conveyor and the second live roller conveyors and at least one of the size of the article, the weight of the article, the shape of the article, and the method of packaging the article.

20. The non-contact article rotating apparatus of Claim 19 wherein all applicable clutch/brake assemblies will actuate at the same time when the article has traveled sufficiently far on the non-contact article rotating apparatus so as to

be located entirely upon at least one of the second plurality of live rollers of the second live roller conveyor that are equipped with clutch/brake assemblies.

21. The non-contact article rotating apparatus of Claim 19 wherein, as the article begins to rotate and move forward, the clutch/brake assemblies are selectively actuated as their respective clutch/brake sensors are triggered until an allotted rotating time has expired.

22. The non-contact article rotating apparatus of Claim 21 wherein all the clutch/brake assemblies that are still engaged will disengage at the same time to restore drive to all the second plurality of live rollers of the second live roller conveyor under the article to halt rotation of the article when the article has turned through a desired amount of rotation about its generally vertical axis.

23. The non-contact article rotating apparatus of Claim 22 further comprising an auto-correction mode that gives the non-contact article rotating apparatus the ability to detect whether or not the article has rotated properly as it exits the non-contact article rotating apparatus and provides an article orientation signal to the control device.

24. The non-contact article rotating apparatus of Claim 23 wherein, if the auto-correction mode utilizes the article orientation signal to allow the control device to automatically adjust at least one control output to adjust the rotating

time to achieve the desired amount of rotation on later articles that will be traveling through the non-contact article turning apparatus.

25. The non-contact article rotating apparatus of Claim 24 wherein the auto-correction mode uses a first distance detecting sensor to detect a first position of the article and then a second position of the article as the article traverses the non-contact article rotating apparatus, and wherein the first and second positions are used to calculate the angle of the article in relation to the travel of the article on the non-contact article rotating apparatus.

26. The non-contact article rotating apparatus of Claim 24 wherein the auto-correction mode uses a first distance detecting sensor to detect a distance A between the first distance detecting sensor and the article, and a second distance detecting sensor to detect a distance B between the second distance detecting sensor and the article, both distance A and distance B being detected at generally the same time.

27. The non-contact article rotating apparatus of Claim 26 wherein the distance A and the distance B are used to calculate an angle C between the longitudinal axis of an article on the non-contact article rotating apparatus and the longitudinal axis of the non-contact article rotating apparatus.

28. The non-contact article rotating apparatus of Claim 27 wherein the angle C is used to adjust the activation time of the clutch/brake assemblies to achieve a desired amount of rotation of the article about its generally vertical axis.

29. The non-contact article rotating apparatus of Claim 24 wherein an angle C_1 between the longitudinal axis of an article on the non-contact article rotating apparatus and the longitudinal axis of the non-contact article rotating apparatus is determined based upon the orientation of the article traveling on the non-contact article rotating apparatus as detected by two distance sensors that have been mounted above or below the non-contact article rotating apparatus, and wherein the angle C_1 is used to adjust the activation time of the clutch/brake assemblies to achieve a desired amount of rotation of the article about its generally vertical axis.

30. The non-contact article rotating apparatus of Claim 24 wherein an angle C_2 between the longitudinal axis of an article on the non-contact article rotating apparatus and the longitudinal axis of the non-contact article rotating apparatus is determined by utilizing an overhead machine vision system or camera to detect the placement and orientation of the article on the non-contact article rotating apparatus, and wherein the angle C_2 is used to adjust the activation time of the clutch/brake assemblies to achieve a desired amount of rotation of the article about its generally vertical axis.

31. The non-contact article rotating apparatus of Claim 24 wherein the activation and deactivation time of the plurality of clutch/brake assemblies is determined manually by the operator who can adjust a rotating timer that controls the activation time of the plurality of clutch/brake assemblies.

32. The non-contact article rotating apparatus of Claim 31 wherein the operator adjusts the rotating timer by one of either pressing an INCREASE TURN button to increase the article rotating time, or a DECREASE TURN button to decrease the article rotating time, or by positioning a selector switch to either increase or decrease the article rotating time, the article rotating time in each instance being determined by the adjusted value of time within the rotating timer.

33. A non-contact article rotating apparatus comprising:

a first conveyor having a first plurality of individual rotating transporting components,

a second conveyor having a second plurality of individual rotating transporting components, and

means for rotating an article moving on a non-contact article rotating apparatus by selectively varying a speed of at least one individual rotating transporting component within one of either the first plurality of individual rotating transporting components or the second plurality of rotating transporting components such that the article is rotated a specific amount around the article's generally vertical axis.

34. The non-contact article rotating apparatus of Claim 33 wherein an article moving on the non-contact article rotating apparatus is rotated a specific amount around the article's generally vertical axis by varying a speed of the second conveyor in relation to a speed of the first conveyor.

35. The non-contact article rotating apparatus of Claim 34 wherein each of the individual rotating transporting components of the first plurality of individual rotating transporting components and the second plurality of rotating transporting components include live rollers, and wherein the first conveyor is a first live roller conveyor containing a first plurality of live rollers and the second conveyor is a second live roller conveyor containing a second plurality of live rollers.

36. The non-contact article rotating apparatus of Claim 35 wherein the live rollers of the first live roller conveyor are driven by a first drive belt and wherein the live rollers of the second live roller conveyor are driven by a second drive belt.

37. The non-contact article rotating apparatus of Claim 36 further comprising a first plurality of snub rollers that urge the first drive belt against the live rollers of the first live roller conveyor and a second plurality of snub rollers that urge the second drive belt against the live rollers of the second live roller conveyor.

38. The non-contact article rotating apparatus of Claim 37 further comprising means for one of either reversing or stopping the rotation of at least one of the live rollers on the second live roller conveyor.

39. The non-contact article rotating apparatus of Claim 38 wherein the means for stopping the rotation of at least one of the plurality of live rollers on the second live roller conveyor includes a plurality of clutch/brake assemblies that control the second plurality of snub rollers.

40. The non-contact article rotating apparatus of Claim 39 wherein each of the plurality of clutch/brake assemblies comprise a solenoid valve, a guided pneumatic cylinder, a brake pad, and a clutch/brake sensor, and each of the clutch/brake assemblies is operatively connected to at least one of the second plurality of snub rollers, and the at least one of the second plurality of snub rollers and at least one brake pad are attached to a connector assembly attached to a cylinder rod of the guided pneumatic cylinder, and wherein the guided pneumatic cylinder is normally extended, with the at least one of the second plurality of snub rollers pushes against the second drive belt to drive at least one of the live rollers of the second live roller conveyor.

41. The non-contact article rotating apparatus of Claim 40 wherein the clutch/brake sensor of one of the plurality of clutch/brake assemblies detects the article as it travels upon the non-contact article rotating apparatus, wherein upon such detection, the sensor provides a signal to a control device that activates the

solenoid valve of the related clutch/brake assembly to move the connector for that related clutch/brake assembly such that the brake pad mounted onto the connector contacts at least one of the live rollers of the second live roller conveyor and at least one snub roller of the second plurality of snub rollers is urged away from the second belt to thereby stop the at least one live roller of the second live roller conveyor from rotating.

42. The non-contact article rotating apparatus of Claim 41 wherein activation of the solenoid valve of the clutch/brake assembly causes the cylinder rod to move which in turn moves at least one of the second series of snub rollers away from the second conveyor, while simultaneously applying the brake pad to at least one of the live rollers of the second live roller conveyor to stop the live roller from rotating.

43. The non-contact article rotating apparatus of Claim 41 wherein the solenoid valve for one of the plurality of clutch/brake assemblies is deactivated when the clutch/brake detector senses the article has passed by the live roller of the second live roller conveyor that has been stopped from rotating thereby allowing the connector to move upward to release the pressure applied by the brake pad to the live roller that was stopped from rotating, while the connector at the same time urges at least one snub roller from the second plurality of snub rollers into contact with the second drive belt such that the second drive belt rotates the at least one live roller of the second live roller conveyor.

44. The non-contact article rotating apparatus of Claim 43 wherein the amount of time the article takes to rotate about its generally vertical axis is based upon the conveyor speed of the first and second live roller conveyors and at least one of the size of the article, the weight of the article, the shape of the article, and the method of packaging the article.

45. The non-contact article rotating apparatus of Claim 44 wherein all applicable clutch/brake assemblies will be actuated at the same time when the article has traveled sufficiently far on the non-contact article rotating apparatus so as to be located entirely upon live rollers of the second live roller conveyor that are equipped with assemblies.

46. The non-contact article rotating apparatus of Claim 45 wherein all the clutch/brake assemblies that are still engaged will disengage at the same time to restore drive to all live rollers of the second live roller conveyor under the article to halt rotation of the article when the article has turned through a desired amount of rotation about its generally vertical axis.

47. The non-contact article rotating apparatus of Claim 46 further comprising means for automatically correcting the amount the article is rotated on the non-contact article rotating apparatus and then adjusting the amount of rotation of the article such that articles that exit the non-contact article rotating apparatus are in a specific orientation.

48. The non-contact article rotating apparatus of Claim 47 further comprising means for manually adjusting the amount of rotation the non-contact article rotating apparatus rotates the article about the article's generally vertical axis.

49. The process of rotating an article about the article's vertical axis while the article is traveling on a conveyor, the process comprising the steps of:

conveying an article on a conveyor;

detecting the article as it is conveyed on the conveyor;

rotating the article a specific amount of rotation about the article's generally vertical axis, such rotation of the article being accomplished without contacting any surface of the article that is not generally in contact with the conveyor as the article is transported upon the conveyor; and

allowing the article to proceed on the conveyor after the article has been rotated.

50. The process of rotating an article about the article's vertical axis while the article is traveling on the conveyor of Claim 49 wherein the step of rotating the article a specific amount of rotation about the article's generally vertical axis includes providing a first live roller conveyor and a second live roller conveyor adjacent to, and generally parallel to the first live roller conveyor.

51. The process of rotating an article about the article's vertical axis while the article is traveling on a conveyor of Claim 50 further comprising the step

of adjusting the speed of the second live roller conveyor such that the article that is resting simultaneously upon the first live roller conveyor and the second live roller conveyor is rotated about its generally vertical axis.